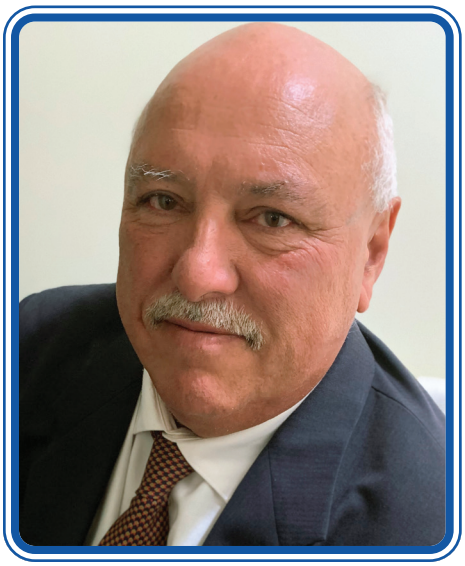
Caskanette Udall
CONSULTING ENGINEERS

FORENSIC ENGINEERING NEWS AND VIEWS

March 2023

President's Box



By Rene Caskanette

To improve our capacity for environmental engineering projects we have added a new senior environmental consultant Dave Giles. Many in the insurance world will know his name since he has been working in the industry for many years with various companies. We are delighted that Dave chose us as his newest employer, and I am confident he will be a perfect fit here and will continue to serve clients in a competent and professional manner.

Bob Caskanette manages our environmental services group of experts, and we now have a team with the training and experience in all areas outlined in this newsletter, to make sure our clients have quick and reliable answers when they need them.

We recently redeveloped our website with a fresh new look, and it launched on February 22. It contains all the details on our services and personnel, so check it out.

www.caskanette.on.ca

We are currently advertising for new structural engineers in Kitchener and London, to expand our capacity in those areas too.

In July we will celebrate our 25th anniversary, a milestone we have worked hard to reach, and a source of pride for me as the company founder. We have grown and expanded our personnel and services, to always ensure we can offer clients the quick and top quality service we have become known for.

Environmental Engineering Services

24/7 Emergency Spill Response (Commercial, Trucking and Residential)

It is estimated that more than 40% of all fuel oil spills reported annually in Ontario are from domestic fuel oil tanks at private homes. Fuel oil spills have a major impact to the surrounding environment. Contamination of soil, groundwater and surface water poses a major problem for surrounding ecosystems and habitats. Migration of fuel oil contamination through groundwater can lead to problems downstream such as groundwater well contamination, aquifer and drinking water contamination, and potential habitat destruction. Fuel oil that has spilled into a residential basement can also pose a serious health hazard, threatening indoor air quality. Anyone who owns a fuel oil tank has a legal responsibility to properly maintain it and to clean up any spills or leaks that may occur.

Releases of contaminants can also occur at roadsides or other areas away from structures following vehicle or agricultural equipment accidents, fires or even train derailments. Safeguarding the health and safety of persons and the environment are imperative. Identifying the contaminants involved is also important, whether it is petroleum hydrocarbons (PHC's), volatile organic compounds (VOC's), SVOC's, metal/inorganics, manure/liquid waste, fertilizer, pesticides, or other chemicals. These types of spills can occur at any time of day or night and it is important to respond quickly, setup containment and begin remediation as quickly as possible to mitigate unnecessary costs and project scope due to the spread of the contaminant plume and identify and block pathways where the plume could travel. Roadside spills can often involve culverts, drainage ditches and other pathways which can affect nearby wetlands or environmentally sensitive areas. We are able to respond quickly when emergency calls come in and have an extensive list of capable environmental remediation contractors, we often work with who are ready to go on short notice when emergencies occur.

When there is a discharge of a contaminant into the natural environment such as soil, groundwater or surface water, the person(s) responsible must report it to the Ministry of the Environment, Conservation and Parks (MOECP) and/or Technical Standards and Safety Authority (TSSA), via the Spills Action Center (SAC). The MOECP administers the Environmental Protection Act (EPA) and the Ontario Water

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Resources Act (OWRA). They respond to spills affecting more than one property owner, or spills on public lands or into drainage systems. The TSSA administer the Technical Standards and Safety Act (2000), Ontario Regulation 213/01 Fuel Oil, CSA B139-00 Installation Code for Oil Burning Equipment, and GA1/99 October 2001 Environmental Management Protocol for Operating Fuel Handling Facilities in Ontario. Section 16 was adopted for addition to the B139-00 Code. Other stakeholders or regulatory authorities may also become involved such as various Conservation Authorities, just as one example.

Qualified persons (QPs) such as professional engineers, hydrogeologists and other environmental experts will be ordered to verify the cleanup is done in compliance with the prescribed standards.

The stringent environmental regulations present in Ontario helps reduce the damage to the natural environment caused by spills and releases. Having the right consultants and contractors in place will go a long way to help reduce the amount of contamination escaping into soil, groundwater and surface water throughout sites in Ontario, as well as minimize environmental impacts, project costs/scope and future liability. We are here when you need us most.

Designated Substance Surveys (DSS)

It is very concerning that many are still unaware of the regulations and legal requirements surrounding designated substances and hazardous materials in buildings in the Province of Ontario.

Building owners in Ontario are required under the Occupational Health and Safety Act (OHSA) to determine if there are any designated substances present at a project site prior to any construction or demolition activity. The owner and constructors are required to provide this information as part of the tendering information or to prospective contractors (and subcontractors) of a project before entering into a binding contract. This means that a Designated Substance Survey (DSS), either partial or full, is required for buildings prior to any materials within those buildings being disturbed or removed to legally satisfy this requirement. It is the law and not subject to our interpretation of when to obey it and when to disregard it.

Many consultants and contractors refer to the age of 1986 or older as the year for needing to have a DSS completed and leave a buffer as some excess asbestos containing building materials may have been used in buildings following 1986. Most felt buildings built in the 1990's or later were fairly safe to not have designated substances present and often wouldn't undertake an assessment or have any sampling done. But this is incorrect and also illegal. While the chances of finding designated substances goes down in buildings built in the 1990's or newer, it does not disappear. We have been finding designated substances present in many buildings built in the 1990's and 2000's. Contaminated building materials and other items brought in from other countries are an ongoing concern. Use of older materials in long term storage can also be a concern. The Ministry of Labour (MOL) who enforces the OHSA, will tell you as they have told us, they expect a DSS to be completed whenever materials are removed from any building during construction/restoration/renovation projects. Even buildings that were built very recently. They do not have a cutoff year for this requirement as there is no way to verify what is present within a material or building without assessing it and sampling it. Assuming you know the answer is not enough. It is required by law and mandatory that a DSS be completed in all buildings to protect from potential liability and to ensure the safety of workers and building occupants. If a contractor tells you that you do not need one, that should be a red flag and we recommend you find another contractor.

What is a designated substance?

A designated substance is defined as "a biological, chemical or physical agent or combination thereof to which the exposure of a worker is prohibited, regulated, restricted, limited or controlled." In Ontario, there are eleven (11) designated substances regulated under O.Reg. 490/09, including:

- Acrylonitrile, Arsenic, Asbestos, Benzene, Coke Oven Emissions, Ethylene Oxide, Isocyanates, Lead, Mercury, Silica and Vinyl Chloride.

The regulations apply to every employer and worker at a workplace where the designated substances are present, produced, processed, used, handled or stored and at which a worker is likely to be exposed to the designated substance. Specific regulations apply to each of these designated substances above such as O.Reg. 278/05 for Asbestos projects as just one example.

So what is a Designated Substance Survey (DSS)?

These assessments are performed to identify designated substances (and other hazardous materials) within the work area that may present a hazard to workers or occupants if disturbed. These substances are commonly a component of building materials or equipment found within buildings. A DSS is performed by a competent person/consultant such as us. Contractors are not competent and do not have the necessary credentials to undertake such assessments. To summarize, a DSS includes:

- A walkthrough of the facility to identify materials suspected of containing designated substances.
- Locations, types and conditions of the suspect materials.
- Collecting samples of suspect materials to be analyzed by an accredited laboratory.
- Providing a professional DSS report to the owner/client. The DSS report can be provided to prospective contractors so that measures can be taken to protect workers.

Other hazardous materials which can also be assessed during a DSS include:

- Chemical Hazards – Urea Formaldehyde Foam Insulation (UFFI)
- Biological Hazards – Mould Contamination, Animal/Rodent Feces/Contamination
- Environmental Hazards – Polychlorinated Biphenyls (PCBs) and Ozone Depleting & Global Warming Substances

What if a DSS is not completed?

- An owner/client is legally liable to the constructor, as well as every contractor, and subcontractor for loss or damages if a list of designated substances within a building was not provided or designated substances within a building were not identified.
- An owner/client/contractor can be fined under the Occupational Health and Safety Act (OHSA) or even face jail time. Fines vary, but can often be in the tens of thousands or more. A recent fine we saw an owner receive was for $60,000 for failing to determine whether any designated substances were present at the project site, and failing to prepare a list of all designated substances present. Another example seen recently was a contractor violating the asbestos regulations on a project who spent 30 days in jail and was fined $45,000.

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- The Ministry of Labour (MOL) can issue a "stop work" order or a contractor may refuse to complete the work. This can cause significant delays and money. The Ministry of the Environment, Conservation and Parks (MECP) and the police may also become involved at times depending on the nature of the violation (such as illegal hazardous waste dumping, etc.).
- Persons must be aware of the hazards and appropriate controls must be put in place to protect workers and occupants within a building. Liability and litigation could follow if the project is not done right from the start. This is very big business in the United States and is being seen more often in Canada. This trend to litigation is expected to increase in future years.

But what if the building or most of it is going to be demolished? Demolishing a building does not remove the legal requirement to identify and remove (to the extent practicable) designated substances such as asbestos from the building prior to demolition. However, if a professional engineer (P.Eng.) or other qualified consultant has deemed that a section of a building or entire building is legitimately unsafe to enter (such as collapse concerns, etc.), then this requirement does not apply, as it is no longer "practicable" to identify and remove potential designated substances from the building safely as workers could be put at risk. This is the only exception to the law that we are aware of. However, provisions to protect workers during the demolition can still be put into place under the guidance of a professional and competent consultant. A DSS is perhaps most important in buildings undergoing full demolition as the potential for exposure is high. A DSS of a building can also be partial and limited to the specific project. For example, if the project only involves the basement of a two storey finished structure, then the DSS can be limited to the basement area where work is to be performed. It must be clearly stated that the other areas within the building have not been assessed and will require assessment if they are to be disturbed.

A professional and competent consultant is critical to navigate and breakdown the complex legal requirements for each individual project and to ensure a professional DSS is properly completed to protect the liability of owners, clients and contractors and to safeguard the health and wellbeing of workers and building occupants. Contractors are not competent or credentialed to undertake such an assessment. Our team of professional engineers and scientists are happy to help navigate you through these legal requirements to protect from liability and to safeguard workers and occupants within a building. Remember, it is the law and is mandatory for all building projects.

Mould and Water Damage Claims

Mould growth can occur in as little as 48 hours following a water loss, provided conditions are appropriate. If a professional consultant is brought in quickly following a loss, mould sampling can be done to determine if pre-existing mould growth already exists in the home. This information can save considerable money on the remediation project for the insurance company in excluding older damages. While there is no laboratory test available to tell you the exact age of any mould, a fast response time, site inspection and sampling following the loss, along with our expert observations and analysis can often provide answers as to when the mould growth began and the source or sources of moisture responsible. There are many other indications of potential older pre-existing damages within a building which our experts are trained to identify.

If certain mould species are identified in a timeframe that is not consistent with their required growth phase, this can indicate it is a pre-existing condition. We work with contractors and insurance companies to respond to claims immediately to conduct a detailed assessment. Yes, we do work weekends and evenings when necessary. There can be problems if there are delays in the claim being reported, which may make the analysis more difficult. However, some mould species require 7-10 days to establish, so the window of opportunity may be larger in some cases and identification of this mould early on helps to separate new damage from old. Delays in having an assessment done will pose issues with this however.

Bacteriological Testing

While mould growth can be a major problem following a water loss, people often forget about potentially harmful pathogens left behind on surfaces contacted by the Category 3 water (such as sewage). Health effects to those exposed can be devastating as witnessed by past events of E.Coli exposure through drinking water in Walkerton. The highest risk often occurs in children, the elderly and immune compromised or suppressed individuals, as their bodies cannot fight the pathogens as well if they are exposed. If mould growth or sewage contamination becomes an issue in a building, containment should be immediately addressed to isolate the affected area(s) and the use of drying equipment and HEPA air scrubbers evaluated. Air scrubbers vented to the exterior within a containment zone provides a negative air pressure differential within the containment zone(s) and filter harmful airborne mould spores or pathogens out of the indoor environment. It also ensures air flows from clean spaces to contaminated spaces, and not the other way around.

Many pathogens can be found in Category 3 water, including harmful bacteria and viruses. The bacteria of concern in sewage is primarily gram negative bacteria such as E.Coli, Pseudomonas, Shigella and Salmonella, which can be transmitted from hand to mouth contact. Children often make the basement a play area, the elderly may have an in-law suite in a basement, which is where sewer backups typically affect. Kids being kids will put their hands on everything and increase their chances of contracting harmful pathogens if the surfaces have not been properly cleaned and sanitized/sterilized. Restoration contractors use a number of products to clean and sanitize surfaces contacted by sewage water, but mistakes do happen and areas can be missed. Alcohol based sterilizers are some of the best products to use on affected materials as it will kill essentially any bacterial related pathogen it comes across on contact.

Bacterial swabs can be collected from surfaces and finish materials, or even contents following professional cleaning to assess the effectiveness of the treatment and identify if harmful gram negative bacteria (such as fecal coliforms) are present. Contents can be evaluated to determine whether they can or cannot be effectively cleaned and if so if the cleaning was successfully done by the contractor. Generally, any contents affected by sewage however should be discarded. The swabs are collected and sent to a specialized laboratory where they are cultured for approximately 24 hours and analyzed to identify what coliforms are present, if any.

This type of analysis is very cost effective and can be done in conjunction with mould clearance testing (if applicable) or can be done separately at the end of a project not involving mould abatement, prior to residents re-occupying the area. These simple steps will put the homeowners at ease and eliminate

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Environmental Engineering Services

potential liability for insurance companies and restoration contractors, knowing that there are no potential biological threats pertaining to the loss remaining in the home following the restoration work. It is also crucial in identifying appropriate and detailed scopes of work required for a restoration project and ensures the work being undertaken is specific to the insured loss and separates damages which are not related. We have the experts to give you the important answers you need.

Combustion Byproduct Delineation/Soot Mapping and IAQ

After a fire loss, issues often arise pertaining to smoke odour and soot residue within a building and on contents. How far has the contamination reached? Have wall or ceiling cavities been compromised? What pathways are present? What building materials and contents require removal and replacement? What items can be cleaned and salvaged? Should sealing and encapsulation of some areas be considered? What about HVAC? Undertaking professional smoke and soot contamination mapping within a building will help answer these questions and establish a restoration protocol for the contractor to administer.

A detailed assessment and understanding of the building and building construction is essential. We offer a combination of qualitative sampling and quantitative air sampling/screening and surface sampling services that give an overall analysis of the level of contamination within a building and/or on contents in question. We can assess quantitatively if incomplete products of combustion (broken down by smoke/soot/ash/charred material) are present on a material or surface or in an air space to establish how far the restoration needs to go to help avoid unnecessary costs. This is helpful prior to a fire restoration being completed to establish the scope of work required and also following the restoration during clearance testing to identify if the project was completed successfully.

Many types of samples are analyzed by Gas Chromatography Mass Spectrometry (GCMS) at an accredited laboratory. Our laboratory experts can identify the compounds found within the samples down to parts per million (ppm) or parts per billion (ppb) concentrations and can even assist us with determining the source of the particular compounds identified in special or more unusual circumstances such as industrial/commercial fire losses.

Professional reports are completed outlining the results of the assessment to assist you with making an informed decision. A detailed restoration and cleaning protocol is established at the beginning of the project. These may be the critical answers you need to handle a claim both quickly and economically. Following a restoration, final air clearance sampling can be compared to available Health Canada Residential Indoor Air Quality Guidelines and other guidelines or industry recognized levels where available to ensure no issues are present prior to re-occupancy to protect the health and safety of occupants and from potential future liability.

Narcotics Assessments and Testing

There is an ever growing awareness and concern of Fentanyl use and the resultant contamination in buildings and vehicles from illicit drug use. Fentanyl is a highly potent synthetic opioid which rapidly acts to depress the central nervous system and respiratory function. Opioids interact with opioid receptors in the brain and elicit a range of responses within the body; from feelings of pain relief, to relaxation, pleasure and contentment.

Fentanyl and its analogues pose a potential hazard to persons who could come into contact with these drugs. Possible exposure routes to fentanyl and its analogues can vary based on the source and form of the drug. Persons are most likely to encounter illicitly manufactured fentanyl and its analogues in powder, tablet, and liquid form. Potential exposure routes of greatest concern include inhalation, mucous membrane contact, ingestion, and percutaneous exposure (e.g., needle puncture). Any of these exposure routes can potentially result in a variety of symptoms that can include the rapid onset of life-threatening respiratory depression.

Currently, there are no established federal or consensus occupational exposure limits for fentanyl or its analogues. However, the Canadian Centre for Occupational Health and Safety (CCOHS) states the lethal dose of fentanyl is approximately 2 milligrams (mg) of pure fentanyl, roughly equivalent to four grains of salt, which would kill the average adult. However, this varies and is subject to many other factors, such as the persons weight and opioid tolerance.

A building or vehicle can become easily contaminated with fentanyl and other illicit narcotics from drug users. This is a concern for all persons entering a building or vehicle where such drug use has taken place and those environments need to be assessed prior to entry to ensure the safety and wellbeing of those persons. A small accidental exposure can lead to significant adverse health effects which could be fatal in persons unaware there is a hazard or who are not properly safeguarded against the hazard.

We have recently begun a working relationship with a specialty narcotics restoration company and have access to real-time portable scanning equipment to test for a library of narcotics in a building or vehicle, including fentanyl. Swab samples can be collected on surfaces and analyzed within one minute in real time down to the nanogram in detection sensitivity. Additional narcotics that can be assessed and identified include but are not limited to; amphetamine, buprenorphine, cocaine, ephedrine/pseudoephedrine, heroin, ketamine, MDA, MDMA, methamphetamine, morphine, papaverine, pethidine, THC, tramadol, acetylfentanyl, butyrfentanyl, carfentanyl, furanylfentanyl, 3-methylfentanyl and W-18. There is also the capability to test for the qualitative presence or absence of fentanyl and other compounds in the air in addition to surface samples. This is key in identifying if contamination is present within a building or vehicle so proper safeguards can be put into place for persons that may be exposed.

We undertake assessments of buildings and vehicles for fentanyl and other narcotics contamination and can fully scan all areas to determine if concerns are present. We can also collect additional samples to be submitted to the laboratory if required for additional confirmation. We provide professional reports with detailed remediation and abatement protocols to be followed by certified contractors which are based on industry best practices currently available.

Final clearance inspections, sampling and reporting is then undertaken to ensure the building environment, vehicle or contaminated space is deemed safe. This is critical to protect the future liability of homeowners, insurers and other stakeholders involved. We are always here to answer any questions you may have. Our team looks forward to assisting you on your next project.

Environmental Engineering Services

Radon Testing

Radon is a naturally occurring radioactive soil gas, which is produced by the breakdown of Uranium in soil, rock, and water. Radon is the second leading cause of lung cancer deaths in the USA and Canada after smoking and it accounts for approximately 3200 deaths per year in Canada alone. Radon is the largest single source of radiation in the world, accounting for approximately 42% globally. By comparison, the nuclear industry accounts for approximately 1%. It is the leading cause of lung cancer globally in non-smokers.

Radon is present in all areas of the world at varying concentrations. Radon is colourless and odourless and cannot be detected in a building without testing.

Radon is a noble gas, which means it is not chemically reactive. It passes through most filters but will adsorb to charcoal. It is carcinogenic and will cause lung cancer. Radon is heavier than air and therefore tends to sink, so the highest concentrations within a building are generally in the lowest level of the building.

When Radon is breathed into the lungs, it tends to stay trapped inside, bouncing around and striking the lung cells and sticking to the lung tissue. This can cause physical or chemical damage to the DNA, which can then lead to lung cancer.

Radon can enter homes in many ways such as cracks in floor slabs and foundations, sump pits, floor drains, basement windows, building penetrations, potable wells, showers, plumbing fixtures and more. Buildings which are negatively pressurized compared to the soils below and surrounding the foundation cause more radon infiltration. This pressure differential will naturally draw more Radon gas into a building through the various entry routes outlined above. This is the primary reason why Radon concentrations vary so much from building to building. How a building is constructed, pressurized and potential entry points vary greatly from building to building, even those which are neighbouring one another. There is no way to predict what the concentrations will be within a building without testing.

Radon testing and mitigation will be on the rise in the years to come. Health Canada has guidelines for testing within a home or in a public building. All consultants and contractors assessing or mitigating a building with Radon need to be Canadian National Radon Proficiency Program (C-NRPP) trained and certified. Our firm has trained professionals to assess buildings and give you the reliable answers you need. We would be happy to assist you on your next project or answer any questions you may have.

Engineering Cost Controls and Peer Reviews

In the insurance world, there are various appraiser firms that assist insurers with cost control when it comes to contractors. They assist with reviewing the scope and associated costs, among other things. But contractor costs aren't the only thing that can exceed expectations for insurers.

Usually, contractor costs are far more significant than engineering costs, but occasionally engineering fees can become excessive throughout a project. This may be due to a high number of billable hours and the client doesn't understand why there were so many hours or a scope that expands drastically, among other reasons. Our firm has been asked many times in the past to review engineering scope and costs in a variety of areas. Questions arise as to how a scope and the associated fees evolved so much from what was expected to be much more simplistic and/or cheaper.

Environmental jobs can often become expensive as scope creeps as the contaminated areas are identified and delineated, which can cause additional need for sampling and laboratory analysis, consulting, and other fees. No one knows for sure what you're going to find when you begin excavating or drilling boreholes, but knowledgeable experts in these areas have a detailed understanding of what they are getting into after preliminary sampling and analysis, and then build a remediation plan and scope of work to go forward. But what if the plan changes or expands drastically throughout the course of the job? The question arises, was the original scope proper? Was there enough early testing done to attempt to delineate the area so a proper scope could be initially determined? If there was enough sampling and analysis undertaken, was the data properly analyzed to come up with an appropriate scope? Or did something unforeseen happen during remediation that caused the scope to unexpectedly expand? A detailed peer review can help answer these questions and identify if costs incurred were appropriate or is errors were made.

There are other non-environmental engineering situations where something goes drastically wrong and we are asked to review what happened, either from a scope or financial point of view, or both.

For example, a building was under renovation/restoration in the summer and the roof was removed from the building. The building was tarped, but the new roof wasn't installed until the spring. Water infiltrated the home and there was widespread water and mould damage throughout the home and the home was no longer habitable. The contractor stated that there were extenuating, unforeseen engineering issues that were discovered after the roof was removed that resulted in the delays with the new roof installation. We were asked to review the file and assess the project scope and timelines, including the engineering issues that were discovered along the way, and determine whether or not the sequence of events was reasonable or what should have been done from a planning and early engineering investigation stage to ensure this project ran more smoothly once construction began. This file ultimately went to court, and we were qualified in court to give expert witness testimony on this matter.

Another recent example involved an engineer that provided a quote for a specific scope to complete a cause and origin report to determine why a building sustained damages following methane release into their home, and to provide recommendations on remediating the house. The scope ultimately expanded due to unforeseen circumstances and the final bill at the end of the project was approximately four times the quoted amount. We were asked to review the scope of work, report, and invoices of the other engineer to determine what was reasonable and what was not reasonable, and ultimately what an appropriate engineering fee (from a time point of view) would have been for this project with the same scope. Our review found that the hours billed to the client were extremely excessive for the associated scope. This was another file that ultimately went to court, and we were qualified in court to give expert witness testimony on this matter.

We hope all your projects run smoothly and with no issues arising. If they don't, and you're not sure how to sort through what went wrong on a project or assess whether or not scope or fees were excessive or inappropriate, feel free to reach out to us to assist you with sorting out what went wrong and what should have been undertaken. We look forward to working with you on your next project!

Caskanette Udall's Environmental Team

New to the Environmental Team

Dave Giles

As a graduate of Sir Sandford Fleming College, Dave completed several contract positions in research and highway construction quality control prior to focusing the last 18 years of his career providing environmental consulting services to the insurance industry.

As a senior project manager, Dave provides emergency spill remediation consulting services for trucking, residential and commercial claims, mould assessment and sampling, designated substance surveys, asbestos and lead abatement remediation protocols, soot and combustion by product assessments and narcotics clearance testing. Dave also has experience as a contractor, managing spill remediation projects and operating heavy equipment.

With Dave's proven experience he is a valuable consultant on any environmental claim.

Bob Caskanette

Bob Caskanette is an Environmental Specialist as a Licensed Engineering Technologist (LET) with the Professional Engineers of Ontario (PEO). Bob has over 15 years of experience in the field of consulting and engineering.

Bob is a certified Environmental Professional (EP), with specializations in Site Assessment and Remediation, Water Quality, Air Quality, Health and Safety, and Waste Management, by the Environmental Careers Organization (ECO) of Canada. Bob is also a certified Radon measurement professional and was trained in the Canadian National Radon Proficiency Program (C-NRPP), as well as a Certified Indoor Environmental Consultant (CIEC).

Bob manages designated substance survey (DSS) projects and hazardous material project management and abatement (i.e. Asbestos, Lead, PCBs, Mercury and Mould), clandestine drug labs and marijuana grow ops, indoor air quality (IAQ) investigations as well as other industrial/environmental hygiene related work.

Bob is very well trained and knowledgeable in health and safety requirements for projects, with over 200 hours of health and safety training between college and university courses, as well as industry training and is a certified HST.

In addition to environmental engineering duties, Bob is fully qualified to handle assignments in fire cause and origin investigation. He is a Certified Fire and Explosion Investigator (CFEI), Certified Vehicle Fire Investigator (CVFI), and a Canadian Certified Fire Investigator (CCFI-C). Bob is an active member of the National Association of Fire Investigators (NAFI), Canadian Association of Fire Investigators (CAFI), International Association of Arson Investigators (IAAI), and the National Fire Protection Agency (NFPA). Bob is currently on the CAFI executive board of directors, effective since April 2015 and currently holds the position of 1st Vice President.

Alex Caskanette

Alex graduated in 2017 from the University of Western Ontario with a Mechanical/Material Engineering degree. He is recognized as a Professional Engineer with the PEO and is a Certified Fire and Explosion Investigator.

Alex has technical training and expert knowledge across the engineering disciplines: mechanical, material, accident reconstruction and failure analysis. Alex has participated in numerous joint examinations of failed systems, assemblies, and components to determine the root cause of failure. He has comprehensive experience investigating the failures of metals, plastics and ceramics.

Alex's expertise also includes fire cause and origin investigations, personal injury accidents, and environmental assessments (including designated substance surveys (DSS) and mould remediation).

Please visit our new website at **www.caskanette.on.ca**

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